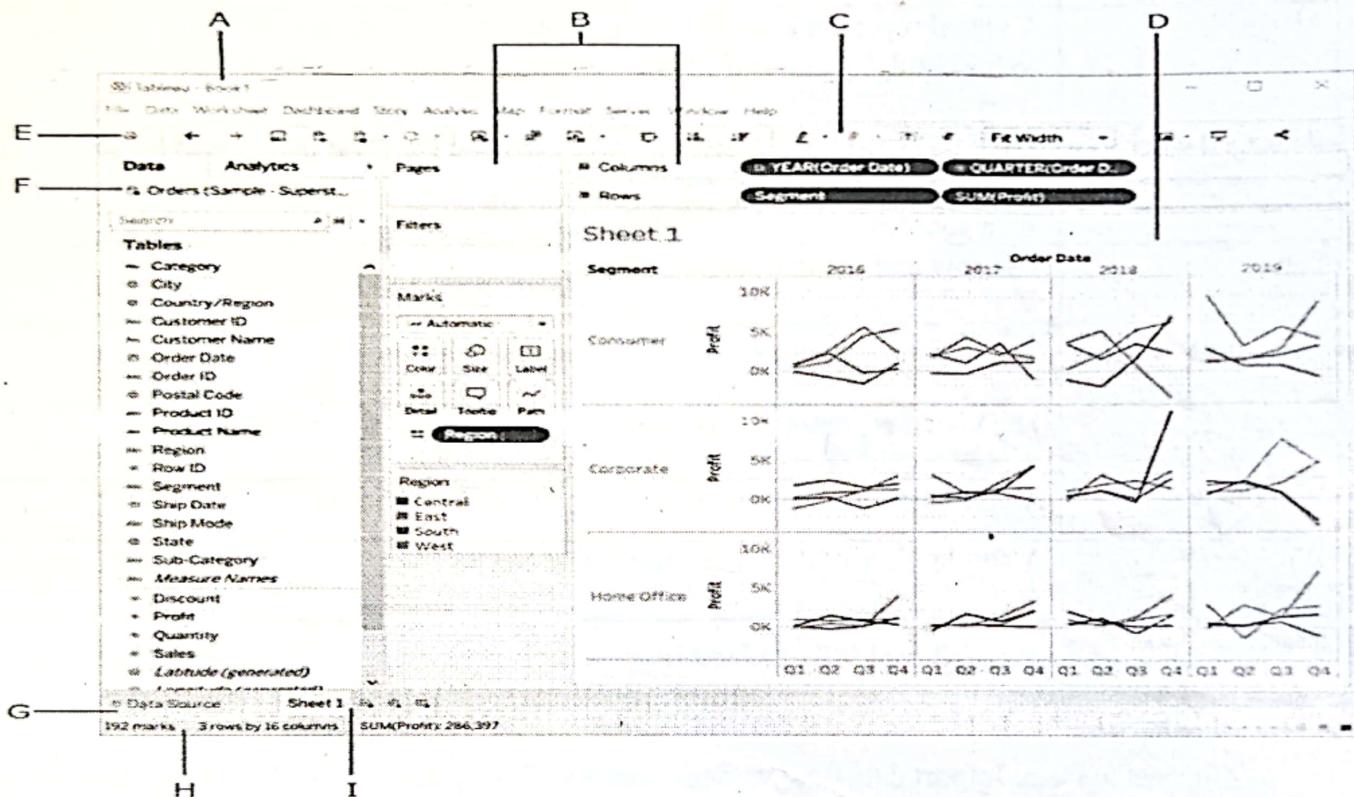


DATA VISUALIZATION LAB (BAIL504)

1. Getting Started – Tableau workspace, Tableau terminologies, Basic functionalities.

Tableau workspace:

The Tableau Workspace is the primary interface where you create and interact with visualizations. It's designed to provide a seamless experience for data analysis and storytelling.



- Workbook name. A workbook contains sheets. A sheet can be a worksheet, a dashboard, or a story. For more information, see [Workbooks and Sheets](#).
- Cards and shelves - Drag fields to the cards and shelves in the workspace to add data to your view.
- Toolbar - Use the toolbar to access commands and analysis and navigation tools.
- View - This is the canvas in the workspace where you create a visualization (also referred to as a "viz").
- Click this icon to go to the Start page, where you can connect to data. For more information, see [Start Page](#).
- Side Bar - In a worksheet, the side bar area contains the Data pane and the Analytics pane.
- Click this tab to go to the Data Source page and view your data. For more information, see [Data Source Page](#).
- Status bar - Displays information about the current view.
- Sheet tabs - Tabs represent each sheet in your workbook. This can include worksheets, dashboards, and stories. For more information, see [Workbooks and Sheets](#).

Tableau terminologies:

Cross-tab	Another name for a text table or a table of numbers.
Dashboard	A collection of views shown in a single location where you can compare and monitor a variety of data simultaneously.
Data source	The underlying data that Tableau Reader is connected to. You can't change the data source in Tableau Reader.
Filter	A control on a view that limits the data shown in a view. For example, a filter on region that only includes the West.
Marks	A visual representation of one or more rows in a data source. Mark types can be bar, line, square, and so on.
Packaged workbook	A type of workbook created in either Tableau Desktop or Tableau Server. These files contain both the workbook as well as copies of the referenced local file data sources and background images.
Pane	The row and columns areas in a view.
Repository	A folder located in your My Documents folder that stores workbooks.
View	The visual representation of your data in a worksheet or dashboard.
Workbook	A collection of one or more worksheets and dashboards.
Worksheet	A single view of data. Each worksheet can be connected to a single data source.

Basic functionalities:

- Data Connection:
 - Connect to Data: Import data from various sources such as spreadsheets, databases, cloud services, and web data connectors.
 - Live Connection vs. Extract: Choose between connecting directly to your data (live) or creating a snapshot (extract) for offline use and performance optimization.
- Data Preparation:
 - Data Blending: Combine data from different sources by defining relationships.
 - Data Joins: Merge data from different tables or sources based on common fields.
 - Data Cleaning: Use built-in tools to clean and preprocess your data, such as handling null values, changing data types, and renaming fields.
- Creating Visualizations:
 - Drag-and-Drop Interface: Easily build visualizations by dragging fields onto rows and columns, or onto the Marks shelf.
 - Common Charts: Create bar charts, line charts, pie charts, scatter plots, and more.
 - Maps: Generate geographic visualizations if your data includes location information.
- Filters and Sorting:

- Apply Filters: Restrict the data displayed in your visualizations using filters, which can be applied to specific dimensions or measures.
 - Sorting: Arrange data in ascending or descending order based on one or more fields.
- Creating Dashboards:
 - Combine Visualizations: Bring together multiple worksheets into a single dashboard for a comprehensive view.
 - Interactive Elements: Add interactive features like filters, dropdowns, and buttons to allow users to interact with the dashboard.
- Creating Stories:
 - Sequential Views: Build a narrative by combining multiple visualizations and dashboards into a story, guiding users through data insights.
- Calculated Fields:
 - Custom Calculations: Create new fields using formulas based on existing data, allowing for custom metrics and logic.
- Parameters:
 - Dynamic Inputs: Use parameters to create dynamic controls that can adjust calculations, filters, and visualizations based on user input.
- Formatting:
 - Customize Appearance: Format visualizations and dashboards, including adjusting colors, fonts, and sizes to improve readability and aesthetics.
- Sharing and Publishing:
 - Save and Export: Save workbooks locally, export visualizations as images or PDFs, and share them via email or other platforms.
 - Tableau Server/Tableau Online: Publish workbooks to Tableau Server or Tableau Online for collaborative access and sharing with others.
- Tooltips:
 - Additional Information: Display extra details about data points when users hover over them.
- Legends and Annotations:
 - Explanatory Notes: Add legends to explain the meaning of colors and sizes, and annotations to highlight important data points or trends.

2. Connecting to Data Source – Connecting to Database, Different types of Tableau Joins.

Connecting to Database:

- Open Tableau: Start Tableau and choose to connect to a data source..
- Select Database: On the Data Connection page, select the type of database you want to connect to. Tableau supports various databases, including:
 - Relational Databases: SQL Server, MySQL, PostgreSQL, Oracle, etc.
 - Cloud Databases: Google BigQuery, Amazon Redshift, Snowflake, etc.
 - Other Sources: Microsoft Access, SQLite, etc.

- Enter Connection Details: Provide the necessary connection details, such as server name, database name, user credentials, and any additional parameters required by the database.
- Sign In: Click the "Sign In" button to establish the connection. Tableau will load the list of available tables and views.
- Import Data: Once connected, you can select the tables or views you want to import. You may also need to specify how you want to use the data, such as by choosing specific columns or applying initial filters.

Different types of Tableau Joins:

Tableau provides several types of joins for this purpose:

- Inner Join: Returns only the rows where there is a match in both tables. Rows without matches in either table are excluded.
- Right Join (Right Outer Join): Returns all rows from the right table, and the matched rows from the left table. If there is no match, the result will contain NULL for columns from the left table.
- Left Join (Left Outer Join): Returns all rows from the left table, and the matched rows from the right table. If there is no match, the result will contain NULL for columns from the right table.
- Full Outer Join: Returns all rows when there is a match in either the left or right table. If there is no match, the result will contain NULL for columns in the table without a match.

3. Creating a view – formatting charts, adding filters, creating calculated fields and defining parameters.

Creating a view in Tableau involves combining data, formatting charts, adding filters, and potentially defining parameters. Here's a breakdown of these steps:

- Connecting to Your Data Source
 - Choose a connector: Select the appropriate connector based on your data source (e.g., Excel, CSV, SQL database).
 - Provide credentials: Enter the necessary information to establish a connection.
 - Explore your data: Browse the available fields and tables.
- Dragging Fields to the View
 - Dimensions: Fields that categorize or group data (e.g., "Region," "Product Category").
 - Measures: Numerical fields that can be aggregated (e.g., "Sales," "Profit").
 - Drag and drop: Place fields on the appropriate shelves (Rows, Columns, Marks, Filters, etc.) to create visualizations.
- Choosing a Chart Type
 - Select a chart: Choose the chart type that best suits your data and visualization goals (e.g., bar chart, line chart, pie chart).
 - Adjust the chart: Customize the chart's appearance using the "Format" menu.

Formatting Charts

- Colours: Select a colour palette that enhances readability and visual appeal.
- Fonts: Choose fonts that are easy to read and consistent with your overall design.
- Marks: Adjust the size, shape, and opacity of marks.
- Axis labels: Customize the appearance of axis labels and gridlines.
- Legend: Position and format the legend as needed.

Adding Filters

- Drag fields to the "Filters" shelf.
- Choose filter types: Select "Quick Filter" or "Filter" to create various filter options.
- Apply filters: Specify the values or conditions you want to filter by.

Creating Calculated Fields

- Navigate to "Analysis" -> "Create Calculated Field."
- Write a formula: Use Tableau's syntax to create new fields based on existing data.
- Use calculated fields: Incorporate them into your visualizations.

Defining Parameters

- Create parameters: Define variables that can be manipulated to control different aspects of your view.
- Use parameters: Incorporate them into calculations, filters, or formatting.

4. Dashboard Design and Storytelling – Components of Dashboard, understanding how to place worksheets in Containers, Action filters and its types.

Components of a Dashboard: A Tableau dashboard is a collection of worksheets (charts, graphs, or tables) arranged in a specific layout. Key components include:

- Worksheets: Individual visualizations that display data.
- Containers: Boxes that hold worksheets and other elements.
- Titles and Captions: Text elements that provide context and explanation.
- Filters: Interactive elements that allow users to filter the data.
- Legends: Explanations of symbols or colours used in visualizations.
- Parameters: Variables that can be adjusted to control the behaviour of the dashboard.
- Actions: Interactions that trigger changes in other elements.

Placing Worksheets in Containers: Containers are essential for organizing worksheets and other elements on a dashboard. They provide a structure and help improve the overall layout.

- Drag and drop: Simply drag a worksheet onto a container to place it.
- Resize containers: Adjust the size of containers to fit your layout.
- Arrange containers: Use the "Arrange" menu to move, align, or distribute containers.
- Create floating containers: Place worksheets outside of the main dashboard area.

Action Filters and Their Types: Action filters are interactive elements that allow users to trigger changes in other visualizations based on user actions.

- Click actions: Triggered when a user clicks on a mark in a visualization.
- Hover actions: Triggered when a user hovers over a mark.
- Selection actions: Triggered when a user selects multiple marks.
- Highlight actions: Highlight marks in other visualizations based on selections.
- Filter actions: Filter data in other visualizations based on selections.
- URL actions: Open a URL based on selections.

5. Introducing Power BI – Components and the flow of work, Power BI Desktop Interface- The